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COMMENTS ON: DANIEL KAHNEMAN, " NEW CHALLENGES TO THE RATIONALITY ASSUMPTION"

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This paper is a useful integration of research that Professor Kahneman has conducted with several co-authors. The phenomena of individual decisions is a source of nagging curiosity for many sciences, applications of sciences, and philosophy. What he has to say should be of great interest to a very large research community. In discussing his paper I will narrow the perspective to economics and to a lesser extent political science, in the hope of facilitating better and more complete understanding of the fundamental and important perspective that he and his co-authors bring to those particular sciences.

At the outset I should say that I do not like the word "rationality" used in the title. Consequently, I am not particularly sympathetic with Kahneman's overall purpose to "argue for an enriched definition of rationality". The concept lacks scientific precision and as a result is a source of needless controversy and misunderstandings. Many theoreticians have attempted to eliminate the inherent vagueness by defining types. Aizerman et.al. (1985) for example, connects the concept of rationality to notions of "optimality" and then produces vastly different concepts of optimality and substantially generalizes classical scalar optimization and the associated use of binary relations over states. The concept of rationality can be connected with notions of logic or it can be connected with notions of specific purpose. The word "rationality" can be emotionally charged by social philosophy and the connotations of equality and justice that are carried implicitly in the consistency (or lack thereof) of social decisions. Rationality is a very broad term that engenders disagreements where enough disagreement exists already. I will return to this issue later.

Interest in Kahneman's work need not be tied to any particular view of the status of concepts of rationality or the definition of the word. The results stand on their own. The substance of reported research is to develop a theory of human (and perhaps non human) decisions that rests on four laws. The first three reflect years of previous work and the fourth law is the primary focus of the current paper. The laws can be summarized as follows:

Law 1. Decisions are a reflection of decision utilities that are carried by changes to situations and not situations themselves. That is, in the context of decisions the items valued are changes from state to state and not the states themselves, as is generally supposed in decision theory.

Law 2. Changes are relative to a special state called a "reference point" that is determined by the cognitive "frame" that exists in the decision environment.

Law 3. Decision utilities foster risk seeking in the loss domain (loss aversion).

Law 4. Decision utilities are influenced by beliefs about hedonic experiences that are determined by states.

The background interpretation these four laws is in terms of decisions as a process as opposed to a single act. The purpose is to provide a theoretical framework that captures a merging of possibly conflicting attitudes and perceptions into an overall choice. Laws 1-3 are clearly beginning to take a structure from which behavioral propositions can be deduced. For example, the existence of an "endowment effect" can be deduced from the first three laws. Similarly, the existence of differences in willingness to pay and willingness to accept can be deduced from the first three laws as a corollary to the endowment effect.

The fourth Law, the new addition and the major subject of the current paper, is an attempt to capture the relationship between decisions and internal states, hedonic experiences as Kahneman calls them. The ideas are based on reports of cardinal measures of sensations such as pain that one might naturally assume is associated with a disutility or, in terms of the awkward language of preference theory, one would assume is associated with states that an individual would prefer to avoid. The striking result is that the reported preferences over experiences are not related to the integral or the duration of pain experienced. Instead, preferences are based on the peak levels of pain and the pain experienced at the end of an episode. Kahneman theorizes that the decision process that produces this striking result is one that operates through a memory geared to record peaks of experiences more than duration or exposure. That memory process then produces a cognitive representation of events that is used for decisions.

The experiments stimulate many new questions. One wonders if this memory capacity is only cognitive, or is typical of the other types of memory capacities of animals. Would non cognitive learning, perhaps of the sort detected by galvanic skin responses, obey the peak and end rules and be related to choices? The attempt to associate something so complex as a decision with an internal state could be an important step to understanding the physiological bases for decisions. New technological developments when joined with new theory could provide a completely new dimension to our understanding of decisions and the role of cognition in decisions. It is easy to share Kahneman's enthusiasm for his work.

There is, however, another aspect of this paper: a sense of complaint that needs to be addressed. The paper contains remarks of a type sometimes encountered in psychologically oriented literature. The remarks suggest a belief that there is a fundamental problem in economics. The title of the paper is ".. Challenges to the Rationality Assumption" and the body of the paper is where "Theoretical and practical implications of these challenges to the assumption of economic rationality are discussed". Of the Allais and Ellsberg paradoxes he says "..It is often implied that if these paradoxes can be resolved, then economic analysis can safely continue to assume that agents are rational. The focus on paradoxes has indirectly strengthened the rationality dogma.." The tone of the paper is that economics is based on a faulty assumption of rationality

supported by an unjustified but "well fortified position" and that the assumption should be discarded and replaced by the laws listed above. That issue and perspective is in need of exploring.

The first question that one might ask is whether or not economics is built on a rationality assumption of the type that Kahneman presupposes. I think that it is not. Economics is full of assumptions of irrationality. For example, in the competitive model agents are assumed to be price takers. They are assumed to believe that they have no influence at all on price even though within the model itself there is substantial evidence to the contrary that is irrationally ignored. A similar irrationality appears in the reaction functions of the Cournot model (or reaction functions in almost any game model) that have agents continuously overlook the fact that their decisions are always systematically wrong. The individuals irrationally react, never learn and never think about the problem. The Cobweb model is an additional example. A monopolist or any imperfect competitor for that matter, in a general equilibrium framework never works through the income effects and other feedback that lead his pricing decisions to influence its own costs and future demand. In public sector models voters irrationally go to the polls to cast their ballots even though they have no return from doing so. In several different game theoretic models an agent could react in any fashion whatsoever if he/she encountered another agent that was not following an equilibrium strategy. Dynamic models frequently contain ad hoc learning and adjustment features that are, in essence, postulating an agent that always makes mistakes and never realizes it. It is well known that the competitive model does not require transitivity at the individual level. Many models involve agents that have random utilities but in making long term decisions do not know that their utilities are random or might change. Models exist that postulate the existence of people who are tied to a decision rule regardless of evidence or consequences of following the rule. The list of irrationalities in economics models is very long. Almost any applied model in economics will have some aspect of irrationality incorporated. Even models of rational expectations have irrational or incomplete features. The word "rational" has no single meaning in economics. The word "THE" that appears in the paper's title and in a similar context throughout the paper, is inappropriate. Thus, it is not exactly clear what it is about economics models that Kahneman is advocating should be changed.

The message of the paper is that economists should stop whatever it is that they are doing and adopt Laws 1-4. If that is not the message, it will nevertheless be interpreted that way by non economics readers and so should be discussed. In either case the message and any such recommendation for economics suffers from substantial problems. Economics is about markets, price formation, entry, the behavior of systems of possibly strategically interacting agents and related social phenomena. Economics is related to but is not the same as decision theory from which Kahneman draws his observations. The notion of a decision plays a special role in the modeling effort in economics and in game theory as well. The individual as it appears in economics, typically is characterized by only such axiomatic structure that is needed for coherence of a model of system behavior. There is no need to capture the complete behavior of an individual in all of its complexity, although if it could be done everyone would be happy.

Given the nature of the phenomena and the purpose of economic science, the model of the individual must be adequate to produce predictions about systems level behavior. If the model cannot do that then it cannot do the work that motivates the modeling effort in the first place. From the four laws can one derive the standard models of economics and game theory? Do the four laws impose substantial restrictions on market and group behavior? Are the four laws reliable in that they are manifest in wide ranging economic activity? If a revolution is needed at the foundations of economics and if Kahneman's research and the research of his co-authors point the way, then the answers to all three questions should be yes. As of this date, that is not the case.

Can one deduce the standard economics models from the four laws? The standard models are known to work reasonably well in predicting behavior, so, if the new set of laws is going to replace the old then one would expect models deduced from the new laws to perform at least as well at established tasks. For example, can one deduce from the four laws alone, the equilibrium properties of the law of supply and demand and predict the ultimate prices that will evolve in a market? I cannot see how it is possible to deduce an equilibrium price without resort to traditional modeling techniques. The problems for the new laws become compounded when games are contemplated. How can the four laws be used to formulate a model with strategically interacting individuals? What type of strategies might be employed against an individual that places values on changes in states and not on states? Indeed, how would one with values on changes even formulate his/her own strategies or does the individual even have the capacity to do such a thing? What type of equilibrium concepts might be employed? How, for example could one formulate the bid functions derived from first price auction theory? With the new laws the whole framework needed to apply models from game theory seems to be lacking. The problems do not stop there. Economic models of multiple markets and general equilibrium are powerful. How would such notions be deduced from the four laws without reverting to the standard economics machinery that the new laws are supposed to replace? Rational expectations models are known to produce amazingly accurate models of systems. If the four laws are used how can any agent know what might be expected of other agents whose decisions would depend upon a subjectively perceived reference point? The core under majority rule has strong predictive power: How could one derive similar predictions from the four laws? Briefly put, I think that phenomena of interest to economics cannot be captured by models that are deduced from the four laws given their current state of development.

Do the four laws place significant restrictions on models of phenomena that are of interest to economics? It appears that anything that might be observed in a social context would be consistent with the four laws. If beliefs, for example, are allowed to wander too much, all patterns of behavior can be described as equilibrium behavior in a game, Ledyard(1986). By just relaxing the belief structure and retaining everything else from game theory, a model results that is not refutable. If the four laws are going to produce models that can be applied to conflicts and if the models are to have empirical content, then much more structure must be added. As the laws stand as a group, they do not appear to have the power to do the job that is needed.

Are the four laws generally reliable? Experiments described in the paper are focused on special types of phenomena as opposed to the broad substance of economics. It seems legitimate to ask if a preponderance of evidence exists in market situations that requires the need of the four laws. In this respect it is easiest to focus on the third law, the propensity of individuals to be risk averse in gains and risk seeking in losses. While many examples exist, a natural place to look for such phenomena would be markets in which some sort of speculation is taking place in which agents have a potential for making losses. When this is done one discovers that individuals that engage in the risky behavior by purchasing something for resale, do so only at prices within the bounds of risk averse behavior. With the item purchased they now face losses that risk seeking behavior would have them assuming risks in order to avoid. This risk seeking behavior is not observed. In other words, the third law does not describe phenomena that is so pervasive and so pronounced in markets that its presence can be easily detected. The reliability of the laws, when applied to commonly observed economic situations, can be called into question.

I suspect that Kahneman does not intend for his position to be interpreted as I have done and that I have taken many too many liberties with his arguments. He could be advocating only slight changes in models as opposed to a revolution. However, even if this is the case there are still problems in appending the proposed laws to economic models. The force of the observations in the paragraphs above still apply. With an economic/game theoretic model so altered can it still be used to produce results of the sort required of economic models? Will it still place restrictions on data? Until this has been demonstrated the complaints are not justified.

I think that Kahneman's paper should be read as outlined in my first remarks. The complaints in the paper should be ignored and the tools that he offers should be accepted on their own terms. The foundations of economics are not yet ready to be replaced by the four laws but I personally think that Kahneman and co-authors are on a productive course. That they have something of value to offer economics is obvious since the challenging phenomena that they have identified would never have been identified by researchers focused by an economic perspective alone. It is not even clear that the theory as it has evolved through economics is capable of pointing researchers in the right direction. While I disagree with the way that he casts his research relative to economics, I fully agree with the words "New Challenges", used in his title. Economists would be badly mistaken to ignore the results that he is reporting.

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